

# Biology in Focus

## Better Lives Through Better Science

### *Missouri River Hooks Its Largest Fish Study*

**F**ew waterways have undergone the kind of human alterations experienced by the Missouri River. Native tribes, fur traders and trappers who used the “Big Muddy” as their highway across the Great Plains would barely recognize the river today. During the past 150 years, the Missouri River has been channeled and dammed to the point where the conservation group, American Rivers, declared it the nation’s most endangered river of 1997.

Once a river with abundant rapids and capricious flow patterns, the Missouri River today is placid and controlled. While artificial changes to the river have resulted in improved navigation, flood control, power generation and irrigation, they have also caused the destruction of many of the river’s natural habitats. Modifications have reduced the river’s average width by two-thirds, shortened its length by more than 120 miles and eliminated 90 percent of its islands and sandbars.

According to the U.S. Fish and Wildlife Service, 82 species of plants and animals that depend on the river and its floodplain are now considered

**Research for the Benthic Fishes Study is conducted by the USGS Environmental and Contaminants Research Center; six cooperative fish and wildlife research units in Idaho, Iowa, Kansas, Missouri, Montana and South Dakota; and the Montana Department of Fish, Wildlife and Parks.**



*A paddlefish is netted for analysis.*

endangered, threatened or of special concern. Moreover, certain fish species (such as the pallid sturgeon and the paddlefish) present in the river since prehistoric times are at risk of being lost forever. On some stretches of the Missouri, the decline of species such as the channel catfish has forced state agencies to halt commercial fishing in certain areas.

In response to these conditions, the USGS Biological Resources Division is participating in the largest fish study ever conducted on the Missouri River. The study, chiefly sponsored by the U.S. Army Corps of Engineers, encompasses the entire mainstem of the Missouri River—approximately 2,300 miles. Known as the Benthic Fishes Study, the project is providing new insights about why certain populations of benthic (bottom-dwelling) fishes are struggling. Study data may also enable river managers to predict how construction and maintenance of the river’s channels and flood control structures can help conserve fish and their habitats while maintaining public uses.



U.S. Department of the Interior  
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**“By studying fish populations of the Missouri River, we will be able to provide river managers with the information needed to make informed conservation decisions.”**

**Charles Berry, leader,  
South Dakota Cooperative Fish  
and Wildlife Research Unit**

## **Partnering Makes a Difference**

The huge scope of the Benthic Fishes Study is possible because of its unique framework and emphasis on partnering. Field work is conducted by the Montana Department of Fish, Wildlife and Parks and by six cooperative fish and wildlife research units at universities in Idaho, Iowa, Kansas, Missouri, Montana and South Dakota. The cooperative research units, staffed by USGS scientists in partnership with cooperating states and universities, reduce the cost of large-scale research because of their proximity to the river, open communication, use of graduate research assistants and cost-sharing with partners. Information management, quality assurance and statistical support for the project are provided by the USGS Environmental and Contaminants Research Center in Columbia, Missouri.

## **Research Provides New Insights**

Researchers selected 26 species of benthic fish for study and examination. Since the study began in 1995, researchers have captured more than 75,000 fish representing 78 species, ranging from a half-ounce emerald shiner to a 47-pound catfish. Most fish are released after data are recorded. All of the target species, including the endangered pallid sturgeon, have been caught and examined.

Researchers capture the fish by using different kinds of nets, from hand-held seines to boat-deployed trawls. To quickly capture large fish, researchers employ a technique known as electrofishing whereby fish are temporarily stunned by an electric field that causes them to rise to the water's surface. The fish can then be easily netted, measured, weighed and returned to the river unharmed.



***Scientists use electrofishing techniques to capture fish.***

By analyzing fish scales, scientists have learned about the growth rates, age and longevity of each species. And by studying the fish collected from habitats such as side channels and tributary mouths, scientists have become knowledgeable about the reproductive success and habitat needs of many species. At each fish

collection site, researchers also measure river characteristics such as velocity, depth and bottom contour. This comprehensive approach has resulted in extensive data that will enable state and federal agencies to better assess how modifications in water management will affect important sport, commercial and threatened fishes.



***Measurements are recorded.***

## **Preliminary Results Are Used**

Even though two years remain in the study, preliminary results are being put to use. The U.S. Fish and Wildlife Service is using project data to reevaluate the status of several fishes proposed for federal listing. Officials have learned, for example, that there are greater numbers of some fish, such as the sturgeon



**The USGS Biological Resources Division supports the sound management of our nation's biological resources by working through USGS science centers and cooperative fish and wildlife research units.**

chub, than previously expected. By helping to identify important management questions and by providing answers to those questions, USGS researchers enable the U.S. Army Corps of Engineers and other management agencies to make better-informed decisions. Using study results, government agencies can implement conservation plans based on scientific knowledge rather than guesswork.

At the state level, biologists are using the study design as a prototype for a multistate, long-term monitoring program for the river. Results from such a program will help state biologists understand how changes in river management affect resident fishes. The program will also enable states to determine whether tax dollars spent on conservation are making a difference.



*Scientists use a seine to collect fish for examination.*

### **Bet You Didn't Know:**

- **The Missouri River basin is home to 10 million people, including 20 Native American tribes.**
- **The Missouri River begins in the Rocky Mountains of Montana, flows through seven states and ends its journey just north of St. Louis.**
- **Lewis and Clark explored the entire length of the Missouri River in 1803–1805.**

### **A Better Quality of Life**

“In the past, management of the Missouri River has not always been beneficial to wildlife or aquatic habitats,” says Charles Berry, a coordinator of the Benthic Fishes Study. “It’s encouraging to be a part of a study that will provide a better understanding of river habitats and, ultimately, enable river managers to protect fish while sustaining public uses.”

Berry hopes that by learning more about aquatic habitats, river managers will be able to manage all that the river offers in terms of irrigation, flood control, navigation, power generation and recreation. As Berry says, “The goal is a healthy, dynamic river that will contribute to the lives of fish and people alike.”

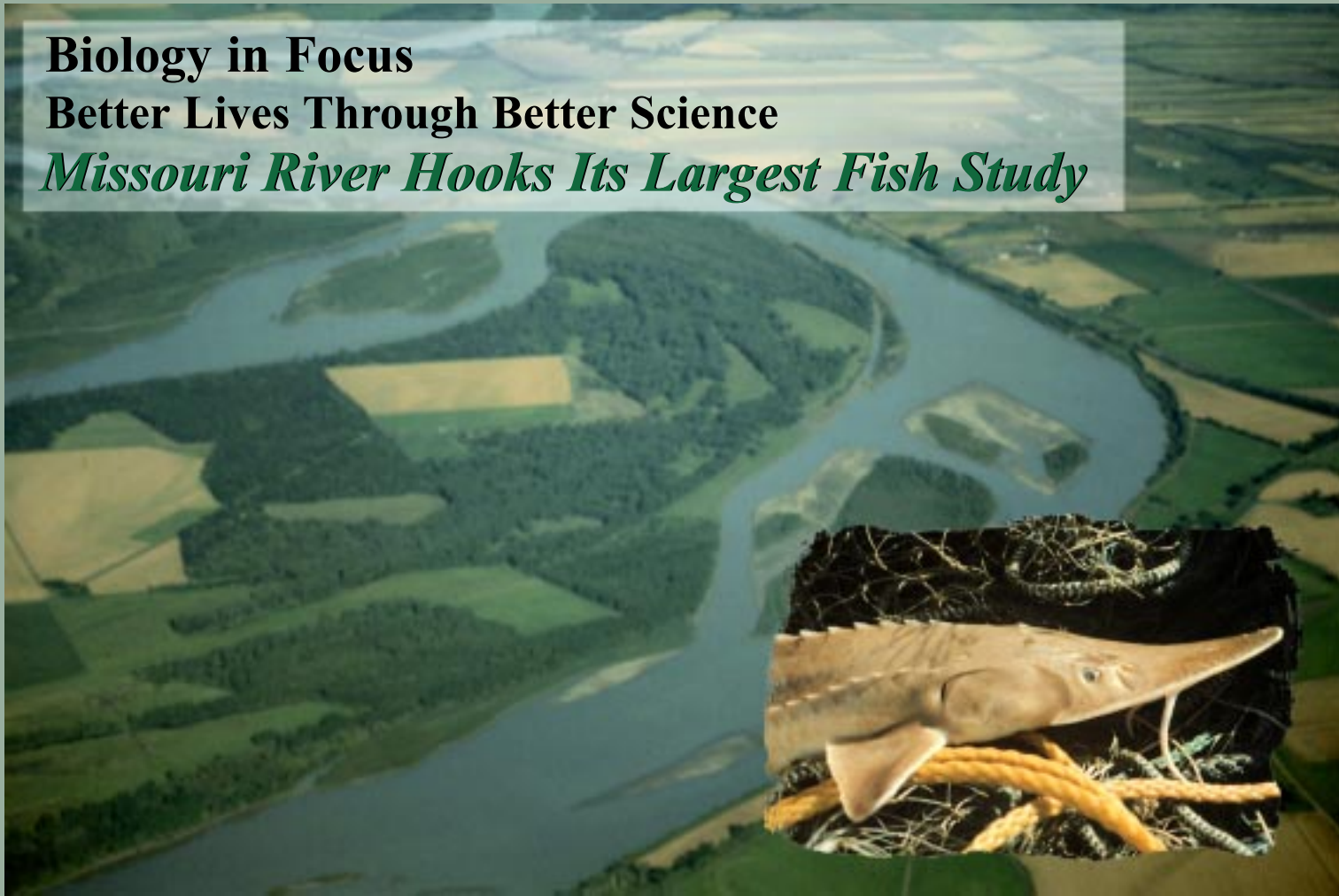
**To learn more about the Benthic Fishes Study and the nation's biological resources, visit the following Internet home pages:**

<http://www.sdstate.edu/~wwfs/http/projects.htm>  
<http://biology.usgs.gov/>  
<http://www.nbs.gov/coop/>  
<http://www.ecrc.cr.usgs.gov/>  
<http://biology.usgs.gov/outreach/infocus.htm>

**Or contact:**

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All photos by the South Dakota Cooperative Fish and Wildlife Research Unit



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